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## CIRCULAR.

CHANGES IN AIRWAYS SERVICE FOR THE PURPOSE OF EFFECT-  
ING ECONOMIES

1. Recently, as a result of a series of conferences between representatives of the Weather Bureau and the Department of Commerce, a general statement of policy was formulated. It has been approved by the Chief of the Weather Bureau and the Assistant Secretary of Commerce for Aeronautics. Its purpose is to effect economies and also to increase efficiency of service for air navigation through as close a coordination of service as possible, consistent with the recognized functions and responsibilities of each of the two agencies. The following paragraphs are quoted from this statement for the information and guidance of Weather Bureau personnel:

"2. For the purpose of utilizing the services of Government employees to the maximum advantage and economy, the duties of employees of one agency may be extended to include duties pertaining to those of the other agency wherever such an arrangement is practicable, advisable in the furtherance of economy, and within the provisions of governing legislation. Instructions concerning duties performed by Department of Commerce employees for the Weather Bureau should be given by Weather Bureau officials, and conversely, instructions regarding services performed by Weather Bureau employees for the Department of Commerce should be given by officials of the latter agency. Accordingly, the existing cooperative arrangement whereby Department of Commerce employees at intermediate landing fields make routine surface weather observations and transmit them to terminal Weather Bureau stations will be extended to include Department of Commerce personnel at other stations where this arrangement can be put into effect.

"3. A 4-hourly system of off-airways reports and a 4-hourly system of forecasts are recommended as substitutes for the present 3-hourly weather service, the hourly weather reports and reports on weather changes to continue as at present.

"4. It is recommended that two sets of upper air observations to fit in with the Weather Bureau's basic system of twice-daily reports and forecasts for the general weather service for the public and forecasts for air navigation be continued as at present and that intermediate upper air observations be arranged to meet the needs of airway schedules and other airway requirements.

"5. Weather maps based on the 4-hourly reports will be prepared on schedule by Weather Bureau employees for teletypewriter transmission. These maps are not intended to replace the twice-

daily transmission of coded weather reports (known as SGL D&A 'signals') to airport stations where standard weather maps showing conditions for the whole country are necessary; provided that such signals be limited to actual requirements, this limit not to exceed 300 words, but subject to increase by mutual consent as future needs and communication facilities may warrant. These signals will be transmitted on schedules properly synchronized with the communication schedules to be inaugurated in connection with full-automatic transmission, including the schedule for teletypewriter maps, which will be transmitted from three key centers at 4-hour intervals throughout the 24-hour period. The teletypewriter maps will carry suitable legend indicating the cooperation of the two agencies involved."

6. In conformity with the foregoing the following instructions are promulgated:

7. Utilizing services of Department of Commerce personnel in making weather observations. At places where this is found to be possible and after authorization by the Central Office and Department of Commerce, designated personnel of the latter will be given instruction and training in making airways weather observations, and will perform this service at times indicated by the Weather Bureau official in charge, when there will be no interference with their essential duties. Only those employees of the Department of Commerce whose duties are of an intermittent character, for example, radio and teletype operators, will be included in this arrangement. Their service in making weather observations will be under the supervision of Weather Bureau personnel. In cases of failure to follow instructions or unsatisfactory service the matter will be presented to the Central Office which in turn will take it up direct with the Department of Commerce.

8. Four-hourly forecast service. Beginning December 1, 1932, the present three-hourly service will be displaced by one at intervals of four hours. Maps will be based on reports from stations along the airways and from selected stations off the airways at the hours of 4 and 8 a.m. and p.m. and noon and midnight, E.S.T. The reports from stations on the airways will be those collected in the blue, brown, and red teletype sequences which now cover the period 18 minutes before to 8 minutes after the hour. The reports from stations off the airways or on airways not equipped with teletype or radio will be of the same form as at present for the 4 a.m. and p.m. and noon and midnight, E.S.T. maps. The observations will be begun as near the hour as possible and in no case earlier than 15 minutes before the hour, unless authorized by the Central Office.

9. At 8 a.m. and p.m. E.S.T., the stations off the airways or on airways not equipped with teletype or radio which now transmit both signal and special 3-hourly reports will not send separate four-hourly messages at these hours after November 30, 1932. The signal reports will themselves be used for the four-hourly maps. At the following stations now forwarding special airways reports at these periods reports of ceiling, visibility and dew point will not be included in the signal reports, although the data will be recorded on Forms 1136, 1138, and 1140-Aer., as heretofore:

Augusta	Knoxville	Sault Ste. Marie
Del Rio	Meridian	Sheridan
Eureka	Modena	Tampa
Grand Junction	Port Huron	Tatoosh Island
Helena	Rapid City	Walla Walla
Huron	Roswell	Wilmington

10. Effective December 1, 1932, a code word to indicate ceiling, visibility, and dew point will be added as the last word to regular 8 a.m. and 8 p.m. observations telegraphed through the SGL D&A system from the following stations:

Brownsville	Macon	Sioux City
Concordia	Mobile	Spokane
Corpus Christi	Montgomery	Springfield, Ill.
Dodge City	North Head	Springfield, Mo.
Grand Rapids	Raleigh	Thomasville
Green Bay	San Antonio	Valentine
Houston	Santa Fe	Winnemucca
Lander	Savannah	

11. No other station, unless specifically authorized to do so, will include this word in telegraphic reports.

12. The code word invariably will consist of five letters, the first coded element being ceiling, the second, visibility, and the third, dew point. A published list of code words is not necessary as they are automatically formed by scheduled arrangement as hereafter described.

13.

CEILING

Y = 0	H = 5
B = 1	N = 6
D = 2	R = 7
F = 3	S = 8
G = 4	T = 9

The numerical values apply to the following code:

<u>Code figures</u>	<u>Feet</u>	<u>Meters</u>
0	0 to 150	0 to 50
1	150 to 300	50 to 100
2	300 to 600	100 to 200
3	600 to 1,000	200 to 300
4	1,000 to 2,000	300 to 600
5	2,000 to 3,000	600 to 1,000
6	3,000 to 5,000	1,000 to 1,500
7	5,000 to 6,500	1,500 to 2,000
8	6,500 to 8,000	2,000 to 2,500
9	Unlimited	Unlimited

14.

VISIBILITY

u = 0
uu = 1
a = 2
aa = 3
e = 4
ee = 5
i = 6
ii = 7
o = 8
oo = 9

Numerical values apply to the following code:

HORIZONTAL VISIBILITY.

Code figures	Objects not visible at
0	50 yards
1	220
2	550
3	1,100
4	1-1/4 miles
5	2-1/2
6	6-1/4
7	12-1/2
8	31
9	Objects visible at 50,000 meters or more.

DEW POINT.

15. Dew point is enciphered to the nearest whole degree, giving values to designated letters as follows:

Y = 0	M = 5
B = 1	N = 6
D = 2	R = 7
F = 3	S = 8
G = 4	T = 9

16. When the dew point is below zero, the complement of the number will be used. Example, dew point -3°; use code letters TR.

REMARKS.

17. When a single vowel is used for the visibility code figure add the letter "Z" to the end of the word. This is done to complete a five-letter code word. It also serves as a check that visibility is indicated by an even-number code figure.

18. Should a word be garbled in transmission, the data can be approximately interpreted from state of weather, clouds and temperature and humidity data shown by other words in the report.

19. If any part of the required data be uncomputed, uncertain, or unknown, substitute the letter X for the appropriate code letters.

EXAMPLES

20. Ceiling 600-1000 feet, visibility, 1-1/4 miles, dew point 36° - FEFNZ  
 " 0-150 " , " 55 yards, " " -11° - YUSTZ  
 " 5000-6500 " , " 1100 " , " 8° - RAAYS  
 " Unlimited , " Unlimited " " zero° - TOOYY  
 " Unknown " 550 yards, " " 27° - XADRZ

21. The special 4-hourly reports at 4 a.m. and p.m., noon and midnight, (E.S.T.) from first order stations to the airways forecasting centers will be transmitted by telegraph or telephone as at present. However, in order that the greatest possible time be allowed for the preparation of the teletype maps at Oakland, Kansas City, and Cleveland, it is necessary that wherever required the reports be sent direct to those stations, instead of to other centers if this is now being done, and from there relayed to the other forecasting centers concerned. Beginning, therefore, with the midnight, E.S.T. observation of December 1, 1932, these special four-hourly reports will be telegraphed, at the periods specified above, as indicated in the following:

To Cleveland:

Augusta	Mobile	Savannah
Grand Rapids	Montgomery	Tampa
Green Bay	Port Huron	Thomasville
Knoxville	Raleigh	Wilmington
Macon	Sault Ste. Marie	

To Kansas City:

Brownsville	Grand Junction	San Antonio
Concordia	Houston	Sheridan
Corpus Christi	Huron	Sioux City
Del Rio	Lander	Springfield, Ill.
Denver	Rapid City	Springfield, Mo.
Dodge City	Roswell	Valentine.

To Oakland:

Eureka	North Head	Tatoosh Island
Modena	Spokane	Winnemucca.

22. Officials in Charge of the various stations concerned will make certain that the reports are forwarded in accordance with the above, beginning on the date indicated.

23. After being received at the centers indicated, the above reports will there be combined in the prescribed form for relay by teletype to all other four-hourly centers in the area immediately following the "brown" se-

quence for that hour. Relays from Cleveland will go direct to Newark, Chicago, and Atlanta; from Kansas City to Chicago, Dallas, Omaha, Cheyenne, Salt Lake City, and Albuquerque, and from Oakland to Portland, Seattle, Burbank, Salt Lake City, and Albuquerque. Relays to other forecasting centers, such as Chicago to Cleveland may be arranged.

24. Reports from Special Stations: Reports from special stations such as Frostburg, Md., Goodland, Kans.; Coalinga, Calif., etc., where only noncommissioned personnel are employed, will be forwarded for all four-hourly periods each day regardless of whether or not map signals are received from these points. These reports are, in many cases, absolutely necessary in the preparation of the teletype maps, and these will be forwarded direct to the map preparation centers as indicated in the following lists:

To Cleveland:

Frostburg, Md.  
Delaware Breakwater, Del.  
Flat Top, W. Va.

To Kansas City:

Clayton, N. Mex.	Guadalupe, Tex.
Goodland, Kans.	Wichita Falls, Tex.

To Oakland:

Bend, Ore.	Marshfield, Ore.
Burns, Ore.	Santa Barbara, Calif.
Coalinga, Calif.	Tonopah, Nev.

25. It will be the duty of the official having supervision of the stations listed above to make arrangements for transmission of the reports as indicated wherever this is not already being done.

26. The reports from special stations thus received at the map centers will be included in the group of reports relayed to other stations.

27. Reports from special stations not included in the above list will continue to be telegraphed or radioed to their present destinations.

28. Telegraph will be used in all cases so far as practicable: In cases in which this is not practicable the reports will be continued to their present destination and a full report made to the Central Office.

29. The relayed reports from the map centers will be sent as a unit from each station, without address or signature, but with a heading, as for example, "Oakland Four-Hourly Reports". Station call letters will be used for indicating the individual stations in the group transmitted.

30. Special relays of four-hourly reports are not to be made to points where the preparation of maps and the issuance of forecasts are not authorized. The present four-hourly forecast centers are:

Albuquerque	Cleveland	Omaha
Atlanta	Dallas	Portland
Burbank	Kansas City	Salt Lake City
Cheyenne	Newark	Seattle
Chicago	Oakland	

31. Schedule of pilot balloon observations: The standard twice-daily observations at about 6:30 a.m. and p.m. E.S.T., will be continued as at present. Owing to the adoption of the four-hourly system of forecasts, however, it will be advisable, in some cases at least, to rearrange the schedules of the intermediate observations. Recommendations for such changes will be given careful consideration by the Central Office and authorized, if believed advisable.

32. Transmission of the four-hourly maps by teletype: The arrangements above outlined are necessary in order that transmission of the four-hourly maps by teletype be accomplished as rapidly and with as little confusion as rapidly and with as little confusion as possible, this service to be inaugurated as soon after December 1, 1932, as possible. These maps will be received at all stations equipped with page-type teletype printers. Transmission will be made in three sections, a Western, a Central, and an Eastern, the Western Section to be transmitted from Oakland, the Central Section from Kansas City, and the Eastern Section from Cleveland. The system of distribution will be so arranged that most stations receiving the Western or Eastern Section will also receive the Central Section, while stations receiving the Central Section maps will also receive the Western or Eastern Section.

33. The maps for each Section will be transmitted within that Section during the hour following the collection of the data, except that those based on the 8 a.m. and p.m. map signals, reports from special stations, and sequence data, will be transmitted in the next hour, this arrangement being necessitated by the fact that the transmission of the map signals will require the time in the hour following 8 a.m. and p.m. The maps for each Section will, therefore, be transmitted in that Section between the hours of 12 and 1, 4 and 5, and 9 and 10, a.m. and p.m., based on data obtained within 20 minutes of 12 midnight and noon, 4, and 8 a.m. and p.m. The second Section received at each station will therefore be transmitted during the second hour following the collection of the data, except those based on the 8 a.m. and p.m. data, which will be during the third hour.

34. Under present plans it is contemplated to begin the transmission of the maps for 12 midnight and noon, and 4 a.m. and p.m., at 18 minutes after those hours. This will mean of course that the map for transmission must be completed at least 5 minutes before this time in order that the teletype operator may have an opportunity to get some tape punched ahead before transmission on the long lines is scheduled. Each map making center should therefore concentrate on this work at these periods and personnel arrangements made accordingly. If necessary, the preparation of the station map should be deferred until this is done.

35. The necessity for expeditious preparation of the map will not obtain so greatly at the 8 a.m. and p.m. periods, as at these times the map will not be required until after 9 a.m. and p.m.

36. The 8 a.m. and p.m. maps will be prepared from the reports available in the red, blue, and brown teletype and radio sequences transmitted near those hours, the reports telegraphed from the special four-hourly stations, and the map signals transmitted by teletype between 8 and 9 a.m. and p.m. As is indicated in paragraph 10, a number of the signal reports from stations which now forward special four-hourly reports by telegraph at those times, will contain a special code word for ceiling, visibility and dew point, which data will be entered on the maps. Also, the cloud words will not be cut from these reports in order that the condition of the sky may be entered in accordance with airways procedure, i.e., as clear, scattered, broken, or overcast. In this connection it may be pointed out that those reports in which a ceiling height is indicated would fall in the category of "broken" or "overcast" as the sky must be more than 5/10 covered with clouds if a ceiling height is given. In the case of the stations from which these words are not received the sky condition according to the airways classification will be inferred from the signals so far as possible.

37. The sequence reports will of course be used wherever possible in the preparation of the 8 a.m. and p.m. teletype maps.

38. General Instructions: The special code words now added to the three-hourly sequence from airport and first-order stations on teletype and radio circuits will, beginning December 1, 1932, be added to those sequences nearest the hours of 12 midnight and noon, 4 and 8 a.m. and p.m. E.S.T., instead of 2, 5, 8, and 11 a.m. and p.m., E.S.T.

39. The teletype maps will be prepared by, or under the immediate supervision of, the Weather Bureau commissioned personnel of the center concerned.

40. The three-hourly reports, maps, and forecasts for the 11 p.m. E.S.T., three-hourly period on November 30, 1932, will be omitted in order that no conflict with the 12 midnight, E.S.T., four-hourly period on December 1, 1932, results.

41. All hours indicated in this Circular are those corresponding to Eastern Standard Time.

42. The airways forecasts will, of course, be prepared each four hours, instead of each three hours, beginning with the midnight, E.S.T., period on December 1, 1932. No change in present assignments of airways to be covered will be made. However, because of necessity for having sufficient time for their preparation and for their transmission on the teletype, these cannot be transmitted before the first part of the hours beginning at 1, 5, and 9 a.m. and p.m. E.S.T. Therefore, these will be issued by each station authorized to do so for a period of four hours, these periods beginning at 2, 6, and 10 a.m. and p.m. E.S.T. The present headings for the forecasts from each station will be continued.

43. In connection with the entire matter, the foregoing will clearly indicate that a definite schedule of transmissions by teletype must be set up and maintained. This is now being prepared by the Department of Commerce on a national scale and will be issued to all concerned prior to December 1, 1932. All stations will cooperate by rigidly adhering to this schedule which has been prepared with the assistance of the Central Office and is approved by it, as regards all transmissions. Comments concerning this schedule or suggestions for changes in it will be taken up with the Central Office and not direct with officials of the Department of Commerce.

44. Officials having supervision of present three-hourly reporting stations where only noncommissioned personnel are employed, will immediately advise such stations of the change in schedule of reports, and instruct them to forward observations only at the times indicated.

45. Since the foregoing will result in lessening the number of observations at all stations involved, the responsible officials will immediately forward recommendations for reductions in salaries of non-commissioned personnel employed for this purpose, wherever practicable.

46. Since, as first stated, the principal purpose of this plan of rearrangement and/or reorganization is to effect substantial additional economies, station officials at stations where this reduction in the number of observations required will make possible advantageous rearrangements of commissioned personnel are requested to forward recommendations along this line to the Central Office immediately: For instance, only two observations between 8 p.m. and a.m. will now be required, and since these fall only 4 hours apart it would appear that one man only would be required for the night work, and he, by reporting near midnight, would not be required to work in excess of eight hours if he remained to take the 8 a.m. observations. It is not believed that it will be necessary to furlough the personnel whose services are found to be surplus at individual stations, but that they will be transferred and utilized in essential work elsewhere.

47. Data will be entered on Forms 1136-1140-Aer., four-hourly instead of three-hourly and summarizations made accordingly, at those stations where only four hourly airways observations will be made under this system. Hourly entries where available will be continued as at present, except that dew point will be entered each four instead of three hours.

48. The Circular, "Instructions For the Preparation and Issuance of Three-Hourly Forecasts", dated May 1, 1932, and the Circular, "Instructions for Making Three-Hourly Reports", are hereby amended wherein they conflict with the terms of this Circular.

49. The foregoing plan will result in a large saving to the Government without impairing the general effectiveness of our work. It will also provide relief at those airways forecasting centers which do not now have as complete a complement of forecasting personnel as is required by the three-hourly system. The cooperation of all personnel is requested and desired.

C. F. Marvin,  
Chief of Bureau.

